

## CLAIMS

I/we claim:

1. A method of fabricating a probe including a cantilever, a body supporting the cantilever and a tip formed at an end of the cantilever, comprising the steps of:
  - 5 forming a first mask layer on an area of a silicon substrate to be formed with the body and the tip;
  - etching the silicon substrate in a predetermined depth using the first mask layer to form the tip;
  - removing the first mask and forming a second mask layer on an area of the silicon substrate
  - 10 except for an area to be formed with the body and the cantilever;
  - forming a boron-diffused layer by diffusing boron into an area to be formed with the cantilever and a predetermined area of the body using the second mask;
  - removing the second mask layer and forming a third mask layer on the boron-diffused layer;
  - and
  - 15 etching the silicon substrate using the third mask layer to form the body and the cantilever.
2. The method of fabricating a probe according to claim 1, wherein the silicon substrate has a  $\langle 110 \rangle$  directional crystal structure.
3. The method of fabricating a probe according to claim 1, wherein the first, second and third mask layers are a silicon dioxide.
- 20 4. The method of fabricating a probe according to claim 1, wherein the step of etching the silicon substrate to form the tip is performed by a reactive ion etching process using  $\text{SF}_6$ , He and  $\text{O}_2$  gases.
5. The method of fabricating a probe according to claim 4, wherein a sharpness of the tip is adjusted by varying a process condition of a constitution ratio of the gases, a power, or a pressure
- 25 during the reactive ion etching process.
6. The method of fabricating a probe according to claim 1, wherein the step of forming the boron-diffused layer comprises steps of ion-implanting the boron and diffusing the boron by a heat treatment.
7. The method of fabricating a probe according to claim 1, wherein the step of forming the
- 30 boron-diffused layer comprises a step of diffusing the boron by a heat treatment using a solid source containing the boron.

8. The method of fabricating a probe according to claim 6, wherein a thickness of the boron-diffused layer is determined by a temperature during the heat treatment and a time of diffusing the boron.
9. The method of fabricating a probe according to claim 7, wherein a thickness of the boron-diffused layer is determined by a temperature during the heat treatment and a time of diffusing the boron.
10. The method of fabricating a probe according to claim 1, wherein the step of etching the silicon substrate to form the body and the cantilever is performed by an anisotropic etching of the silicon substrate.
- 10 11. The method of fabricating a probe according to claim 10, wherein the boron-diffused layer serves as an etching-stopper layer during the anisotropic etching.
12. The method of fabricating a probe according to claim 10, wherein the anisotropic etching of the silicon substrate is performed by using an etchant selected from the group consisting of ethylene diamine pyrocathecol, tetramethyl ammonium hydroxide and potassium hydroxide.